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FEELING THE HEAT: THE ENDANGERED SPECIES ACT AND CLIMATE CHANGE

Andrew J. N. D. Coffey*

INTRODUCTION

“Nothing is more priceless and more worthy of preservation than the rich array of animal life with which our country has been blessed.”¹ Accordingly, Congress and President Richard Nixon enacted the Endangered Species Act of 1973.² The purpose of the Act was to protect endangered and threatened species of plants and animals and their natural ecosystems while simultaneously bringing the listed species back from the brink of extinction.³ To this day, the Act remains one of the most effective conservation statutes in the world, boasting a 99% success rate of keeping listed animals from extinction.⁴ However, animal and plant species are currently facing

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1. Presidential Statement on Signing the Endangered Species Act of 1973, 1973 PUB. PAPERS 1027 (Dec. 28, 1973) [hereinafter Nixon’s Statement]; Gabby Raymond, *Here’s Why the Endangered Species Act Was Created in the First Place*, TIME (July 23, 2018), <http://time.com/5345913/endangered-species-act-history/> [https://perma.cc/8WN4-N6TY].

2. Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended at 16 U.S.C. §§ 1531–1544 (2018)); Nixon’s Statement, *supra* note 1.

3. § 1531(b); *The Endangered Species Act: A Wild Success*, CTR. FOR BIOLOGICAL DIVERSITY, https://www.biologicaldiversity.org/campaigns/esa_wild_success/ [https://perma.cc/LZ4A-4QUT] (last visited Sept. 16, 2018).

4. Sarah Gold, *The Endangered Species Act Won’t Save Animals. It’s Not Designed To.*, SLATE (May 30, 2017, 9:33 AM), http://www.slate.com/articles/health_and_science/science/2017/05/the_endangered_species_act_wasnt_meant_to_save_the_animals.html [https://perma.cc/PCB5-H6JZ]; Jim Lyons, *Zinke’s Plans Could Undermine the Sage-Grouse Conservation Strategy and Endangered Species Act*, CTR. FOR AM. PROGRESS (June 25, 2018, 9:17 AM), <https://www.americanprogress.org/issues/green/news/2018/06/25/452747/zinkes-plans-undermine-sage-grouse-conservation-strategy-endangered-species-act/> [https://perma.cc/N74M-VKM5]; *Protecting the Endangered Species Act*, ENDANGERED SPECIES COALITION, <http://www.endangered.org/campaigns/protecting-the-endangered-species-act/> [https://perma.cc/S47G-6LZ5] (last visited Sept. 16, 2018); KIERAN SUCKLING, NOAH GREENWALD & TIERRA CURRY, ON

another challenge—the “widespread and consequential” dangers posed by climate change.⁵ Scientists use computer-generated models to analyze long-term weather patterns and the Earth’s climate, as well as to predict future climates.⁶ Climate change has already impacted many species, and these models predict that it is just beginning.⁷

Currently, when designating a species as endangered or threatened, the U.S. Fish and Wildlife Service (the Service) is required to use the “best scientific and commercial data available” to evaluate the species’s status.⁸ Further, the Service defines a threatened species as one that is “likely to become an endangered species within the *foreseeable* future.”⁹ On July 19, 2018, the Service proposed several changes to the Endangered Species Act’s implementing regulations, including revisions to the rules for critical habitat designation and

TIME, ON TARGET: HOW THE ENDANGERED SPECIES ACT IS SAVING AMERICA’S WILDLIFE 2 (2012), https://www.esasuccess.org/pdfs/110_REPORT.pdf [<https://perma.cc/AX5E-M3CY>] (1% have recovered and been delisted); *The US Endangered Species Act*, WORLD WILDLIFE FUND, <https://www.worldwildlife.org/pages/the-us-endangered-species-act> [<https://perma.cc/9VRY-DBWE>] (last visited Sept. 16, 2018).

5. Christine Dell’Amore, 7 *Species Hit Hard by Climate Change—Including One That’s Already Extinct*, NAT’L GEOGRAPHIC (Apr. 2, 2014), <https://news.nationalgeographic.com/news/2014/03/140331-global-warming-climate-change-ipcc-animals-science-environment/> [<https://perma.cc/LLK8-RRGM>]; *Understanding the IPCC Reports*, WORLD RESOURCES INST., <https://www.wri.org/ipcc-infographics> [<https://perma.cc/XJV8-FT23>] (last visited Sept. 16, 2018).

6. Christina Nunez, *Is Global Warming Real?*, NAT’L GEOGRAPHIC (Jan. 31, 2019), <https://www.nationalgeographic.com/environment/global-warming/global-warming-real/> [<https://perma.cc/NDZ4-X693>] (last visited Sept. 16, 2018).

7. Press Release, Univ. E. Anglia, Climate Change Risk for Half of Plant and Animal Species in Biodiversity Hot-spots (Mar. 14, 2018) (on file with the Georgia State University Law Review); Dell’Amore, *supra* note 5; *Effects of Global Warming*, NAT’L GEOGRAPHIC, <https://www.nationalgeographic.com/environment/global-warming/global-warming-effects/> [<https://perma.cc/2FGT-JMGT>] (last visited Sept. 16, 2018) [hereinafter *Effects of Global Warming*]; *The Effects of Climate Change*, WORLD WILDLIFE FUND, <https://www.wwf.org.uk/effects-of-climate-change> [<https://perma.cc/V7TJ-4T3K>] (last visited Sept. 16, 2018) [hereinafter *Effects of Climate Change*].

8. 16 U.S.C. § 1533(b)(1)(A) (2018); Seth Jaffe, *Climate Change and the ESA: Protecting the Wolverine in the Face of Uncertainty*, LAW & ENV’T (Apr. 6, 2016), <https://www.lawandenvironment.com/2016/04/06/climate-change-and-the-esa-protecting-the-wolverine-in-the-face-of-uncertainty/> [<https://perma.cc/6RMA-NVL6>]; Douglas MacDougal, *Predicting the Future of the Future: ESA, Climate Change, and the Evolving Contours of “Best Available Science,”* MARTEN L. (Jan. 17, 2017), https://www.martenlaw.com/newsletter/20170117-esa-climate-change-best-available-science#_ednref30 [<https://perma.cc/296K-R5CW>].

9. § 1532(20) (emphasis added); *Donald Trump Has Endangered Species in His Sights*, N.Y. TIMES (July 22, 2018), <https://www.nytimes.com/2018/07/22/opinion/editorials/zinke-interior-endangered-species.html> [<https://perma.cc/9HPZ-BQVW>]; Jaffe, *supra* note 8.

listing species.¹⁰ For example, one proposed change would interpret “foreseeable” as extending only as far as the Service “can reasonably determine that the conditions potentially posing a danger of extinction . . . are *probable*.”¹¹

Recently, courts have gone so far as to hold that model-based climate projections looking almost fifty years into the future constitute the “best available scientific . . . data” for declaring the foreseeability of a species’s threat of extinction.¹² Nevertheless, some argue these models are too speculative to be used as the basis for listing species.¹³ Issues surrounding climate science, what is the “best science available,” and what constitutes “foreseeability” are likely to continue.¹⁴

10. Factors for Listing, Delisting, or Reclassifying Species, 83 Fed. Reg. 35,194 (proposed July 25, 2018) (to be codified at 50 C.F.R. pt. 424); Criteria for Designating Critical Habitat, 83 Fed. Reg. 35,196 (proposed July 25, 2018) (to be codified at 50 C.F.R. pt. 424); Madilyn Jarman, *USFWS and NOAA Fisheries Propose ESA Changes*, WILDLIFE SOC’Y (Aug. 3, 2018), <http://wildlife.org/usfws-and-noaa-fisheries-propose-esa-changes/> [<https://perma.cc/9GEG-NHES>]; Dave Owen, *Seven Thoughts on the Proposed New ESA Rules*, LAW PROFESSOR BLOGS NETWORK (July 19, 2018), http://lawprofessors.typepad.com/environmental_law/2018/07/seven-thoughts-on-the-proposed-new-esa-rules.html# [<https://perma.cc/G7YJ-E6VQ>]; *U.S. Fish and Wildlife Service and NOAA Fisheries Seek Public Input on Proposed Reforms to Improve and Modernize Implementation of the Endangered Species Act*, NOAA (July 19, 2018), <https://www.noaa.gov/media-release/us-fish-and-wildlife-service-and-noaa-fisheries-seek-public-input-on-proposed-reforms>. Although both the U.S. Fish and Wildlife Service and National Marine Fisheries Service implement the Endangered Species Act, the scope of this Note focuses on terrestrial species and will therefore exclusively refer to the U.S. Fish and Wildlife Service as the implementing agency.

11. Factors for Listing, Delisting, or Reclassifying Species, 83 Fed. Reg. at 35,195 (emphasis added); Ari Natter, *Trump Administration Proposes Revamping the Endangered Species Act*, BLOOMBERG (July 19, 2018, 12:04 PM), <https://www.bloomberg.com/news/articles/2018-07-19/law-that-saved-bald-eagle-being-revamped-by-trump-administration> [<https://perma.cc/6KP2-K5SP>]; Amelia Urry, *The Fate of Future Endangered Species Could Hinge on a Semantic Argument*, POPULAR SCI. (July 30, 2018), <https://www.popsoci.com/endangered-species-act-future-walruses> [<https://perma.cc/ETA8-D5KB>].

12. *Alaska Oil & Gas Ass’n v. Pritzker*, 840 F.3d 671, 681 (9th Cir. 2016) (holding the NMFS provided a rational and reasonable basis for evaluating the bearded seal’s viability over fifty years and disclosed the limitations of available data, which is all the Endangered Species Act requires); MacDougal, *supra* note 8.

13. *Alaska Oil & Gas Ass’n*, 840 F.3d at 675 (“Plaintiffs contend that NMFS used climate models that cannot reliably predict the degree of global warming beyond 2050 or the effect of that warming on a subregion, such as the Arctic.”); *Defs. of Wildlife v. Jewell*, 176 F. Supp. 3d 975, 986 (D. Mont. 2016) (arguing the projected threats to the wolverine were based on “unverified models that speculate on a species’ possible future fate, rather than focusing on current population health and trends and immediate threats”); MacDougal, *supra* note 8.

14. MacDougal, *supra* note 8.

The following Note discusses the effects that some of these rule changes will have on the Endangered Species Act in the face of uncertain climate change and the science behind it. Part I examines the background of the Act, its current rules, climate change's impact on the environment, and judicial deference to agency interpretations. Part II analyzes how the current rules further the goals of the Act, how the proposed changes to those rules will add to the confusion surrounding the Act's standards, and the role climate change studies have in both of those implementations. Part III will propose a few alternatives for how the U.S. Fish and Wildlife Service and the Endangered Species Act can accommodate climate change, such as a broader ecosystem-based approach, a narrower approach focused on climate-impacted species, and a conjunctive effort to work with other parties.

I. Background

Prompted by growing concern for the environment, President Nixon signed the Endangered Species Act on December 28, 1973.¹⁵ Congress legislated the Act after finding that many species of animals or plants were extinct—or were in danger of going extinct—after years of economic growth and development without consideration for the environment or conservation.¹⁶ The Act provides a comprehensive legal scheme aimed at defining and listing species that are threatened or endangered, protecting listed species and their critical habitats through recovery plans, and, ultimately, removing species from the list once they have recovered.¹⁷

In addition to being a landmark in environmental legislation, the Act experiences extreme popularity with the American public, regardless of political affiliation.¹⁸ Conservationists and defenders of

15. Erin Blakemore, *How Nixon Became the Unlikely Champion of the Endangered Species Act*, HISTORY (Aug. 19, 2019), <https://www.history.com/news/richard-nixon-endangered-species-act-esa-environment> [https://perma.cc/K2QE-YAGK].

16. 16 U.S.C. § 1531(a)(1)–(2) (2018); Blakemore, *supra* note 15; Raymond, *supra* note 1.

17. §§ 1531–1532; Raymond, *supra* note 1; WORLD WILDLIFE FUND, *supra* note 4.

18. Jeremy T. Bruskotter et al., *Support for the Endangered Species Act Remains High as Trump Administration and Congress Try to Gut It*, CONVERSATION (July 20, 2018, 6:43 AM), <https://theconversation.com/support-for-the-endangered-species-act-remains-high-as-trump->

the Act advocate its success stories, such as saving “iconic American species” like the bald eagle, gray wolf, grizzly bear, and American alligator.¹⁹ However, the Endangered Species Act also has its detractors and controversies.²⁰ Critics of the Act attack it for being both unsuccessful and an expensive barrier to economic development.²¹ Rules concerning critical habitat designation and the listing or delisting process are particularly controversial portions of the Endangered Species Act.²²

administration-and-congress-try-to-gut-it-95279 [https://perma.cc/4VJ5-46Y4]; Misti Crane, *Most Americans Support Endangered Species Act Despite Increasing Efforts to Curtail It*, OHIO ST. NEWS (July 19, 2018), <https://news.osu.edu/most-americans-support-endangered-species-act-despite-increasing-efforts-to-curtail-it/> [https://perma.cc/B49S-CWSD] (“Roughly four out of five Americans support the act. . . .”); ENDANGERED SPECIES COALITION, *supra* note 4 (“Recent polling shows 84 percent of Americans support the Endangered Species Act, and 87 percent agree that it is a successful safety net for protecting wildlife, plants, insects, and fish from extinction.”); Gold, *supra* note 4 (“[P]olls show that some 90 percent of Americans, regardless of political affiliation, support keeping it in place.”); Lovinia Reynolds, *An Endangering Act? Proposed Regulatory Changes to the Endangered Species Act*, ENVTL. L. INST. (July 25, 2018), <https://www.eli.org/vibrant-environment-blog/endangering-act-proposed-regulatory-changes-endangered-species-act> [https://perma.cc/PP83-P82P].

19. Reynolds, *supra* note 18; accord Darryl Fears, *These Creatures Faced Extinction. The Endangered Species Act Saved Them.*, WASH. POST (Mar. 11, 2017, 9:00 AM), https://www.washingtonpost.com/news/animalia/wp/2017/03/11/eight-animals-saved-from-extinction-by-the-endangered-species-act/?utm_term=.2aeee14b66da [https://perma.cc/QBA9-WZU7]; Gold, *supra* note 4.

20. H. Sterling Burnett, *Frog Case Highlights Dangers of and Need to Reform the Endangered Species Act*, BREITBART (Dec. 23, 2017), <https://www.breitbart.com/big-government/2017/12/23/h-stirling-burnett-frog-case-highlights-dangers-of-and-need-to-reform-the-endangered-species-act/> [https://perma.cc/5CPJ-KVXV]; Coral Davenport & Lisa Friedman, *Lawmakers, Lobbyists and the Administration Join Forces to Overhaul the Endangered Species Act*, N.Y. TIMES (July 22, 2018), <https://www.nytimes.com/2018/07/22/climate/endangered-species-act-trump-administration.html> [https://perma.cc/4ET7-TFDE]; Donald Trump Has Endangered Species in His Sights, *supra* note 9.

21. Davenport & Friedman, *supra* note 20; Gold, *supra* note 4; Alan Kovski, *Revamp of Endangered Species Policy Could Spur Development*, BLOOMBERG NEWS (Mar. 23, 2017), <https://www.bna.com/revamp-endangered-species-n57982085639/> [https://perma.cc/F6HN-KA6Y] (“Calculations of potential harm to protected species or their habitats can slow down, reshape or halt projects ranging from road repairs to multibillion-dollar transmission lines.”); Bill Theobald, *Republicans Say Iconic Endangered Species Act No Longer Working, Call for Major Makeover*, USA TODAY (Aug. 28, 2018, 4:33 PM), <https://www.usatoday.com/story/news/politics/2018/08/28/endangered-species-act-gop-wants-overhaul-savior-bald-eagle/1061476002/> [https://perma.cc/A7A7-TFJC].

22. See generally, e.g., *Defs. of Wildlife v. Jewell*, 176 F. Supp. 3d 975 (D. Mont. 2016) (holding the U.S. Fish and Wildlife Service’s decision to withdraw its proposed rule to list the wolverine was arbitrary and capricious after it was challenged by various conservation and wildlife advocacy groups); Holly Doremus, *When is Unoccupied Habitat “Critical”?*, LEGALPLANET (Jan. 24, 2018), <http://legalplanet.org/2018/01/24/when-is-unoccupied-habitat-critical/> [https://perma.cc/TM8W-5WLT]. For example, given the ongoing controversy surrounding critical habitat designation, the Supreme Court recently agreed to hear *Weyerhaeuser Co. v. U.S. Fish and Wildlife Service*, which involves designating

A. Listing and Delisting Species: The Best Science and the “Foreseeable Future”

In order to receive protection under the Endangered Species Act, the U.S. Fish and Wildlife Service must first designate a species as endangered or threatened.²³ The Service is required to make these determinations “solely on the basis of the best scientific . . . data available” at the time of the listing.²⁴ For example, in order to classify a species as “threatened,” the findings must show that the species is “likely to become an endangered species within the foreseeable future.”²⁵ However, the Endangered Species Act does not describe the term “foreseeable future” any further.²⁶ Although the U.S. Fish and Wildlife Service does not define that term in any regulations, the Service has offered a nonbinding interpretation of “foreseeable” to extend as far as the Service can “reasonably rely on predictions about the future.”²⁷ Thus, courts have deferred to the Service’s interpretation of foreseeable on a case-by-case basis.²⁸

B. Occupied or Unoccupied: Designating “Critical” Habitat

Habitat loss continues to be one of the largest threats to wildlife.²⁹ Therefore, when listing a species as endangered or threatened, the

areas unoccupied by the dusky gopher frog as critical habitat. *See generally* Markle Interests, LLC v. U.S. Fish & Wildlife Serv., 827 F.3d 452 (5th Cir. 2016), *vacated sub nom.* Weyerhaeuser Co. v. U.S. Fish & Wildlife Serv., 138 S. Ct. 924 (2018); Doremus, *supra* note 22. “[The U.S. Fish and Wildlife Service] said it would allow the property owners to develop 40 percent of their property if they undertook changes to alter the remaining 60 percent to make it suitable habitat for the frog” Burnett, *supra* note 20.

23. 16 U.S.C. § 1533(a) (2018); *Defs. of Wildlife*, 176 F. Supp. 3d. at 998 (“To receive the full protections of the ESA, a species must first be listed by the Service as ‘endangered’ or ‘threatened.’”).

24. § 1533(b)(1)(A); *Defs. of Wildlife*, 176 F. Supp. 3d. at 999 (“The Service must make these determinations ‘solely on the basis of the best scientific and commercial data available’”).

25. § 1532(20); Jaffe, *supra* note 8.

26. *See, e.g.*, §§ 1531–1544; *Safari Club Int’l v. Salazar*, 709 F.3d 1, 15 (D.C. Cir. 2013) (“The term ‘foreseeable’ is not defined by statute or regulation.”); Urry, *supra* note 11.

27. Memorandum from the U.S. Dep’t of the Interior Office of the Solicitor to the Acting Dir. of the U.S. Fish & Wildlife Serv. (Jan. 16, 2009).

28. *Alaska Oil & Gas Ass’n v. Pritzker*, 840 F.3d 671, 681 (9th Cir. 2016) (“[T]he agency may determine the timeframe for its ‘foreseeable future’ analysis based upon the best data available for a particular species and its habitat.”); *Safari Club Int’l*, 709 F.3d at 15 (“FWS determines what constitutes the ‘foreseeable’ future on a case-by-case basis in each listing decision.”).

29. Chelsea Harvey, *Climate Change is Becoming a Top Threat to Biodiversity*, SCI. AM. (Mar. 28,

U.S. Fish and Wildlife Service must also designate “any habitat” of the species that is considered critical “to the maximum extent prudent and determinable.”³⁰ However, the Service can also decide not to designate “critical habitat” if it is not prudent.³¹ The Endangered Species Act defines critical habitat differently for areas occupied and unoccupied by the species at the time of listing.³²

Although the U.S. Fish and Wildlife Service should not normally include the entire area the endangered or threatened species occupies as its critical habitat,³³ the Service can change its designation over time as appropriate.³⁴ When making the final designation, the Service must do so “on the basis of the best scientific data available.”³⁵ Critical habitat designation, though not directly restricting private action, is often seen by some as an overreach of federal power affecting private land use, and, consequently, the value of the land itself.³⁶

C. Climate Change: A Global Concern or Mere Speculation?

Although habitat loss and human development are the leading threats to listed species, climate change increasingly threatens species as well.³⁷ Climate change refers to the Earth’s response to the

2018), <https://www.scientificamerican.com/article/climate-change-is-becoming-a-top-threat-to-biodiversity/> [<https://perma.cc/4BQ3-V549>]; Peter Lindsey, *The Threat to the World’s Largest Wild Animals is Much Greater Than We Thought*, CONVERSATION (Aug. 21, 2016, 1:53 PM), <https://theconversation.com/the-threat-to-the-worlds-largest-wild-animals-is-much-greater-than-we-thought-64063> [<https://perma.cc/Q84B-HDBB>].

30. § 1533(a)(3)(A)(i); Eric V. Hull, *Protecting Endangered Species in an Era of Climate Change: The Need for a Smarter Land Use Ethic*, 31 GA. ST. U. L. REV. 579, 584 (2015).

31. 50 C.F.R. § 424.12(a) (2018).

32. § 1532(5)(A)(i)–(ii) (designating an occupied area as critical habitat when there are “physical or biological features (I) essential to the conservation of the species, (II) which may require special management considerations or protection,” and an unoccupied area when the U.S. Fish and Wildlife Service determines that the area is essential to the species’s conservation); Doremus, *supra* note 22.

33. § 1532(5)(C) (“Except in those circumstances determined by the Secretary, critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.”).

34. *Id.* § 1533(a)(3)(A)(ii) (the Service “[m]ay, from time-to-time thereafter as appropriate, revise such designation”).

35. 50 C.F.R. § 424.12(a). The U.S. Fish and Wildlife Service must also consider the “probable economic, national security, and other relevant impacts of making such a designation.” *Id.*

36. Burnett, *supra* note 20; Doremus, *supra* note 22.

37. J.B. RUHL ET AL., *THE PRACTICE AND POLICY OF ENVIRONMENTAL LAW* 677 (Robert C. Clark et

increased concentration of greenhouse gases, such as carbon dioxide and methane.³⁸ Climate studies show rising temperatures around the globe.³⁹ Retreating tree lines, melting polar ice caps, and rising sea levels are just some of the impacts already seen from climate change.⁴⁰ Possible future impacts include an increase in severe storms, a decrease in the availability of fresh water, and an increase in the extinction rates of species.⁴¹

In order to study climate change, scientists use climate models to predict how average conditions will change over long periods of time.⁴² These models allow scientists to draw conclusions on past and future climate systems and determine whether abnormal events are the result of climate change or regular climate variation.⁴³ Scientists use samples from trees, ice, and coral, as well as carbon dating, to gather data and increase the accuracy of climate models.⁴⁴ The collected data allows scientists to establish baselines for typical

al. eds., 4th ed. 2016); Sabrina Shankman, *Climate Change Threatens Thousands of Species in Our Lifetime*, INSIDECLIMATE NEWS (Mar. 13, 2018), <https://insideclimatenews.org/news/13032018/climate-change-species-at-risk-biodiversity-plants-animal-migration-global-warming> [<https://perma.cc/G5QK-BRC7>].

38. RUHL ET AL., *supra* note 37, at 633–34; *What is Climate Change?*, BBC NEWS (Dec. 3, 2018), <https://www.bbc.com/news/science-environment-24021772> [<https://perma.cc/Z9AN-G3NA>]; WORLD WILDLIFE FUND, *supra* note 7.

39. *Effects of Global Warming*, *supra* note 7; Nunez *supra* note 6; *The Planet's Temperature is Rising*, UNION CONCERNED SCIENTISTS (Nov. 17, 2016), <https://www.ucsusa.org/global-warming/science-and-impacts/science/temperature-is-rising#.W-DIDKeZOqA> [<https://perma.cc/R5VA-L9EN>].

40. *11 Ways Climate Change Affects the World*, CNN (Feb. 6, 2019, 1:15 PM), <https://www.cnn.com/2014/09/24/world/gallery/climate-change-impact/index.html> [<https://perma.cc/QT76-25Z4>]; *Effects of Climate Change*, *supra* note 7; *Effects of Global Warming*, *supra* note 7.

41. CNN, *supra* note 40; *Effects of Climate Change*, *supra* note 7; NAT'L GEOGRAPHIC, *supra* note 7.

42. Lauren Harper, *What Are Climate Models and How Accurate Are They?*, COLUM. U. EARTH INST. (May 18, 2018), <https://blogs.ei.columbia.edu/2018/05/18/climate-models-accuracy/> [<https://perma.cc/3UV2-6ZW9>].

43. *Id.*

44. *Climate Modeling & Trends*, VIRTUAL KOSHLAND SCI. MUSEUM, <https://www.koshland-science-museum.org/explore-the-science/earth-lab/modeling> [<https://perma.cc/V3TG-6QJP>] (last visited Nov. 4, 2018); Amy Dusto, *Climate at the Core: How Scientists Study Ice Cores to Reveal Earth's Climate History*, NOAA (May 1, 2014), <https://www.climate.gov/news-features/climate-tech/climate-core-how-scientists-study-ice-cores-reveal-earth's-climate> [<https://perma.cc/P3NT-S6GG>]; Harper, *supra* note 42; *How Do Scientists Study Ancient Climates?*, NOAA (Aug. 3, 2018), <https://www.ncei.noaa.gov/news/how-do-scientists-study-ancient-climates> [<https://perma.cc/XM42-8W8T>].

climates that they then test using variables such as increased carbon dioxide to estimate sea level rise, temperature increase, and other events.⁴⁵ Scientists also use past events to test model accuracy, reasoning that if a model can correctly predict past events we know occurred, then it should be able to correctly predict future events.⁴⁶

However, scientists must account for an array of variables such as temperature fluctuations and ocean currents; therefore, climate models always have some level of uncertainty.⁴⁷ Despite this, scientists believe that twenty-first century models are reasonably accurate since they are based on well-founded principles of earth system processes.⁴⁸ In fact, the most recent report published by the Intergovernmental Panel on Climate Change (IPCC)—the world’s leading climate scientists—revealed that the threshold for the most severe effects of climate change is actually almost one degree Fahrenheit lower than scientists believed it to be just a few years ago.⁴⁹ The report discusses previously unknown, immediate consequences of climate change, putting Earth at a “[s]trong [r]isk of [c]risis as [e]arly as 2040.”⁵⁰

D. Judicial Review: Deferring to Agency Interpretation

It is an established principle that courts will accept agencies’ reasonable interpretations of ambiguities in the statutes they regulate.⁵¹ Courts will set aside agency actions when, for example,

45. Harper, *supra* note 42.

46. *Id.*

47. *Id.*; Gabriele C. Hegerl & Tom Russon, *Using the Past to Predict the Future?*, SCI. MAG. (Dec. 9, 2011), <http://science.sciencemag.org/content/334/6061/1360> [<https://perma.cc/7AMT-QTSG>].

48. Harper, *supra* note 42.

49. Coral Davenport, *Major Climate Report Describes a Strong Risk of Crisis as Early as 2040*, N.Y. TIMES (Oct. 7, 2018), <https://www.nytimes.com/2018/10/07/climate/ipcc-climate-report-2040.html> [<https://perma.cc/DJ4F-U37B>]; Jonathan Watts, *We Have 12 Years to Limit Climate Change Catastrophe, Warns UN*, GUARDIAN (Oct. 8, 2018, 2:23 AM), <https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report> [<https://perma.cc/D7H6-W88U>].

50. Davenport, *supra* note 49.

51. *Chevron U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 844 (1984) (“We have long recognized that considerable weight should be accorded to an executive department’s construction of a statutory scheme it is entrusted to administer . . .”); Antonin Scalia, *Judicial Deference to Administrative Interpretations of Law*, 1989 DUKE L.J. 511, 511 (1989).

the action is arbitrary or capricious or in excess of statutory authority.⁵² The three leading theories of statutory interpretation are textualism, intentionalism, and purposivism.⁵³ Following the textualism theory, courts look at the plain meaning of the statute's text.⁵⁴ Courts consider dictionary definitions of terms at the time of the statute's enactment, common grammar principles, or the "whole act," which means construing specific terms within the context of the entire statute to ascertain the statute's "plain meaning."⁵⁵ In *Chevron U.S.A., Inc. v. National Resources Defense Council, Inc.*, the Supreme Court recognized that when Congress expressly gives the agency authority in the statute, the courts should follow a two-step process for reviewing agency actions.⁵⁶ First, the court asks if Congress addressed the issue at hand in the statute; if the answer is no, the court moves to step two which contemplates whether the agency's interpretation is a permissible reading of the statute.⁵⁷ If the agency's interpretation is reasonable, the inquiry ends.⁵⁸

Recently, officials more commonly consider the impact of climate change on species and their habitats.⁵⁹ When making these considerations, the Service must rely on the climate models available

52. 5 U.S.C. § 706(2) (2018); RUHL ET AL., *supra* note 37, at 1007.

53. RUHL ET AL., *supra* note 37, at 850. Textualism relies on the statute's text, intentionalism looks at the legislature's intent when it enacted the statute, and purposivism looks at the legislature's broader purpose for enacting the statute. *Id.* at 850–51.

54. *Bedroc Ltd. v. United States*, 541 U.S. 176, 184 (2004) ("[U]nless otherwise defined, words will be interpreted as taking their ordinary, contemporary, common meaning' at the time Congress enacted the statute." (quoting *Perrin v. United States*, 444 U.S. 37, 42 (1979))). "It is well settled that 'the starting point for interpreting a statute is the language of the statute itself.'" *Gwaltney of Smithfield, Ltd. v. Chesapeake Bay Found.*, 484 U.S. 49, 56 (1987) (quoting *Consumer Prod. Safety Comm'n v. GTE Sylvania, Inc.*, 447 U.S. 102, 108 (1980)).

55. *Bedroc*, 541 U.S. at 182–85 (interpreting the term "valuable minerals" using its common meaning at the time the Pittman Act was enacted and by its statutory context); RUHL ET AL., *supra* note 37, at 851.

56. *Chevron*, 467 U.S. at 842–43; Scalia, *supra* note 51, at 511–12.

57. *Chevron*, 467 U.S. at 842–43; Scalia, *supra* note 51, at 511–12. Although *Chevron* has been viewed as revolutionary, lower courts have nonetheless struggled in applying it. RUHL ET AL., *supra* note 37, at 871; Scalia, *supra* note 51, at 512.

58. *Chevron*, 467 U.S. at 845.

59. Sarah Emerson, *Can the Endangered Species Act Adapt to Climate Change?*, VICE (Oct. 26, 2016, 4:00 PM), https://motherboard.vice.com/en_us/article/9a3gxe/can-the-endangered-species-act-adapt-to-climate-change [https://perma.cc/G23C-NVCN] ("For example, scientists with the [Service] argued that wolverines . . . deserved to be listed as rising temperatures would hurt their ability to den in the snowpack.").

to them.⁶⁰ Nonetheless, there is substantial disagreement concerning the actual threats posed by climate change and how the Act can be used in response.⁶¹

II. Analysis

The Endangered Species Act is imperfect and often gives rise to much controversy, but recently, its critics attacked the law's reliance on science.⁶² Thus, the U.S. Fish and Wildlife Service proposed changes to some of its current rules to “produce the best conservation results for the species while reducing the regulatory burden on the American people.”⁶³ However, the Service is reducing the regulatory burden at the expense of threatened and endangered animals without furthering the Act's purpose. The proposed rules not only undermine the Act but are also ambiguous and overlook its congressionally approved standards.⁶⁴

A. Changing the Rules

The U.S. Fish and Wildlife Service under the Obama Administration defined the term foreseeable broadly, facilitating the listing of species likely to be impacted by climate change as threatened.⁶⁵ Even though that broad definition was a nonbinding interpretation, the Service is now proposing an actual rule setting

60. *Id.*

61. RUHL ET AL., *supra* note 37, at 633.

62. *The Endangered Endangered Species Act*, UNION CONCERNED SCIENTISTS (Aug. 19, 2019), <https://www.ucsusa.org/center-science-and-democracy/preserving-science-based-safeguards/the-endangered-endangered-species-act#.W57-0y2ZO8V> [<https://perma.cc/QRX3-XVWL>].

63. Factors for Listing, Delisting, or Reclassifying Species, 83 Fed. Reg. at 35,195; Criteria for Designating Critical Habitat, 83 Fed. Reg. at 35,196; *U.S. Fish and Wildlife Service*, *supra* note 10; Owen, *supra* note 10; Austin Price, *Trump Administration Wants to Cripple the Endangered Species Act*, SIERRA CLUB (July 27, 2018), <https://www.sierraclub.org/sierra/trump-administration-wants-cripple-endangered-species-act> [<https://perma.cc/V2ZZ-YL4A>].

64. Charise Johnson, *Proposed Changes to the Endangered Species Act Threaten Wildlife*, UNION CONCERNED SCIENTISTS (Sept. 4, 2018, 1:55 PM), <https://blog.ucsusa.org/charise-johnson/proposed-changes-to-the-endangered-species-act-threaten-wildlife> [<https://perma.cc/54EB-JM7R>]; Notes from the Ga. Sierra Club on the Proposed ESA Rule Changes (2018) (on file with the Georgia State University Law Review).

65. Memorandum from the U.S. Dep't of the Interior Office of the Solicitor, *supra* note 27; *Donald Trump Has Endangered Species in His Sights*, *supra* note 9; Reynolds, *supra* note 18.

forth a framework for how it will evaluate the term foreseeable future moving forward.⁶⁶ The Service proposed that “foreseeable future extends only so far into the future as the Service[] can reasonably determine that the conditions potentially posing a danger of extinction in the foreseeable future are *probable*.”⁶⁷

Since “[a] fundamental canon of statutory construction is that . . . words will be interpreted as taking their ordinary, contemporary, common meaning,”⁶⁸ “probable” means “[l]ikely to exist, be true, or happen” in this context.⁶⁹ Further, in at least one instance, the Service interpreted the term “likely” within the Act “as having its ‘ordinary meaning’ or ‘dictionary definition.’”⁷⁰ The definitions for probable and likely mirror each other,⁷¹ creating more ambiguity around the term foreseeable future as opposed to clarifying it.⁷²

Under the proposed rule, the Service will evaluate the “*foreseeable future* on a case-by-case basis . . . taking into account considerations such as the species’ life-history characteristics, threat-projection timeframes, and environmental variability.”⁷³ Further, the Service continues to use the best science available but also “avoid[s] speculating as to what is hypothetically *possible*.”⁷⁴ This new

66. Factors for Listing, Delisting, or Reclassifying Species, 83 Fed. Reg. at 35,201.

67. *Id.* (emphasis added).

68. *Safari Club Int’l v. Salazar*, 709 F.3d 1, 15 (D.C. Cir. 2013) (quoting *Perrin v. United States*, 444 U.S. 37, 42 (1979)).

69. *Probable*, BLACK’S LAW DICTIONARY (10th ed. 2014).

70. *Safari Club Int’l*, 709 F.3d at 14 (explaining how the U.S. Fish and Wildlife Service “reasonably [explained] that the agency interpreted the statutory reference to ‘likely’ as having its ‘ordinary meaning’ or ‘dictionary definition’” in its brief).

71. *Likely*, BLACK’S LAW DICTIONARY (10th ed. 2014) (“[a]pparently true or real; probable”).

72. Letter from the Ctr. for Biological Diversity to Ryan Zinke, Sec’y, U.S. Dep’t of Interior, and Wilbur Ross, Sec’y, U.S. Dep’t of Commerce (Sept. 20, 2018), <https://www.biologicaldiversity.org/campaigns/esa/pdfs/Sign-on-Letter-Opposing-Changes-to%20ESA-Section-7-regulations.pdf> [<https://perma.cc/A828-F2LH>].

73. Factors for Listing, Delisting, or Reclassifying Species, 83 Fed. Reg. at 35,195. The U.S. Fish and Wildlife Service is not going to set a specific time frame but will “explain the extent to which [the Service] can reasonably determine that both the future threats and the species’ responses to those threats are *probable*.” *Id.* at 35,201 (emphasis added). Further, “[t]he analysis of the foreseeable future should, to the extent practicable, account for any relevant environmental variability, such as hydrological cycles or oceanographic cycles, which may affect the reliability of projections.” *Id.* at 35,195.

74. *Id.* at 35,196 (emphasis added); Reynolds, *supra* note 18. “[T]he foreseeable future can extend only as far as the [U.S. Fish and Wildlife Service] can reasonably depend on the available data to formulate a reliable prediction and avoid speculation and preconception.” Factors for Listing, Delisting,

framework will impede the Service's ability to use predictive climate models regardless of the magnitude of possible impacts.

Under existing regulations, the Service does not have to designate critical habitat for a species when it is not prudent to do so.⁷⁵ The regulations list a few factors to consider when determining whether a designation is beneficial.⁷⁶ In its proposed rule change, the U.S. Fish and Wildlife Service adds more circumstances where designating critical habitat would not be prudent.⁷⁷ Specifically, critical habitat designations in situations where threats to the species's habitat come from unmanageable causes would not be prudent because the designations would not prevent the threats.⁷⁸ The Service offers some examples of these situations, such as threats coming from melting glaciers, rising sea levels, or reduced snowfall.⁷⁹ All of these enumerated situations are known results of climate change.⁸⁰

B. An Attack on the Endangered Species Act

Many supporters of the Endangered Species Act believe that it is perfectly acceptable in its current form and that the proposed rules are nothing more than an attack on the Act as part of a larger rollback of environmental protections.⁸¹ Additionally, courts imply that demands for greater scientific precision are insincere and “amount to

or Reclassifying Species, 83 Fed. Reg. at 35,196.

75. 50 C.F.R. § 424.12(a) (2018). A designation is not prudent when: (a) “[t]he species is threatened by taking or other human activity” and identifying critical habitat will likely increase that threat; or (b) “[s]uch designation of critical habitat would not be beneficial to the species.” *Id.*

76. *Id.* (“[T]he factors the [U.S. Fish and Wildlife Service] may consider include but are not limited to: [w]hether the present or threatened destruction, modification, or curtailment of a species’ habitat or range is not a threat to the species, or whether any areas meet the definition of ‘critical habitat.’”).

77. Criteria for Designating Critical Habitat, 83 Fed. Reg. 35,196–97 (proposed July 25, 2018) (to be codified at 50 C.F.R. pt. 424).

78. *Id.* at 35,197. Additionally, those designations “could create a regulatory burden without providing any conservation value to the species.” *Id.*

79. *Id.*

80. *Effects of Climate Change*, *supra* note 7; *Effects of Global Warming*, *supra* note 7.

81. See generally Jimmy Tobias, *The Attacks on the Endangered Species Act Are Part of a Much Deeper Plot*, NATION (Sept. 4, 2018), <https://www.thenation.com/article/the-attacks-on-the-endangered-species-act-are-part-of-a-much-deeper-plot/> [https://perma.cc/SR6G-WKX3]; Urry, *supra* note 11; Justin Worland, *How the Endangered Species Act Helps Save Humans, Too*, TIME (Feb. 15, 2017), <http://time.com/4671860/endangered-species-act-reform-climate-change/> [https://perma.cc/AC6G-TJ3Z].

nothing more than competing views about policy and science.”⁸² Environmentalists are concerned that the new foreseeability analysis will allow the Service to avoid considering climate change models—discounting long-term impacts and limiting crucial protections for species threatened by climate change⁸³—whereas courts currently give the Service broad discretion to consider climate change in its listing decisions.⁸⁴

1. *Climate Change and the Courts*

Although agencies are “not trying to predict the future,” they routinely use predictive models, including climate-related models, to make conservation decisions.⁸⁵ Even though those projections can be volatile, some courts recognize the value of climate projections in the listing process.⁸⁶ Courts acknowledge the scientific consensus regarding the effects of climate change and the fact that temperatures will continue to increase during the century.⁸⁷ Given that consensus, courts “routinely defer to agency modeling of complex phenomena,” so long as the agency gives a reasonable explanation for its approach

82. *Alaska Oil & Gas Ass’n v. Pritzker*, 840 F.3d 671, 679 (9th Cir. 2016) (“Although Plaintiffs frame their arguments as challenging long-term climate projections, they seek to undermine NMFS’s use of climate change projections as the basis for ESA listings.”); *Safari Club Int’l v. Salazar*, 709 F.3d 1, 9 (D.C. Cir. 2013) (quoting *In re Polar Bear*, 794 F. Supp. 2d 65, 69 (2011)) (discussing challenges to the U.S. Fish and Wildlife Service’s decision to list the polar bear as threatened); *accord* MacDougal, *supra* note 8.

83. *Donald Trump Has Endangered Species in His Sights*, *supra* note 9; Stephanie Ebbs, *Trump Administration Proposes Major Changes to Endangered Species Protections*, ABC NEWS (July 19, 2018, 3:43 PM), <https://abcnews.go.com/Politics/trump-administration-proposes-major-endangered-species-protections/story?id=56689773> [<https://perma.cc/4H9H-AGJP>]; Reynolds, *supra* note 18; Urry, *supra* note 11.

84. *See Alaska Oil & Gas Ass’n*, 840 F.3d at 675. The court discusses its review: Our review is “deferential and narrow,” requiring a “high threshold for setting aside agency action” following public notice and comment. We presume an agency’s action is valid, and we will affirm that action “so long as the agency ‘considered the relevant factors and articulated a rational connection between the facts found and the choices made.’”

Id. (quoting *Alaska Oil & Gas Ass’n v. Jewell*, 815 F.3d 544, 544 (9th Cir. 2016)).

85. Emerson, *supra* note 59.

86. *Alaska Oil & Gas Ass’n*, 840 F.3d at 680 (“The fact that climate projections for 2050 through 2100 may be volatile does not deprive those projections of value in the rulemaking process.”).

87. *Id.* at 679–80 (holding the “NMFS did not act arbitrarily or capriciously in concluding that the effects of global climate change on sea ice would endanger the Beringia DPS in the foreseeable future”).

and discloses that approach's limits.⁸⁸ Courts also conclude that the IPCC's climate models constitute the best available science due to the high degree of competence accorded to them.⁸⁹

Further, "[t]he IPCC defines 'likely' as 67-to-90[%] certainty."⁹⁰ Courts note that the Service references that definition in relation to its confidence in the climate models but not as to its estimates on the survival of a species.⁹¹ However, constraining the foreseeable analysis to only probable threats and responses will allow the Service to say things like: "[M]aybe walruses will adapt to areas without sea ice[;] we just do not know."⁹² There is always uncertainty when discussing the future climate, but allowing the Service to use that uncertainty to create unlikely scenarios when making listing decisions moves away from the best available science.⁹³

2. *Weakening the Endangered Species Act by Raising the Bar*

Nevertheless, the new proposed framework opens foreseeable future to interpretation, weakening the foundation of the Act by obscuring the best science available to determine if a species should be listed.⁹⁴ For example, if the Service reviews the best scientific data it has and concludes a species has a 49% chance of becoming extinct due to climate change, it can claim that the species does not meet the new probable standard.⁹⁵ Not only does that imply that the best available science is inadequate, it will create even more confusion

88. *Id.* at 679 ("We have stressed that we 'must defer to the agency's interpretation of complex scientific data' so long as the agency provides a reasonable explanation for adopting its approach and discloses the limitations of that approach."); *Safari Club Int'l v. Salazar*, 709 F.3d 1, 13 (D.C. Cir. 2013) ("While courts routinely defer to agency modeling of complex phenomena" (quoting *Appalachian Power Co. v. EPA*, 249 F.3d 1032, 1053–54 (D.C. Cir. 2001))).

89. *Alaska Oil & Gas Ass'n*, 840 F.3d at 679 ("[W]e adopted the D.C. Circuit's holding that the IPCC climate models constituted the 'best available science' and reasonably supported the determination" (citing *Alaska Oil & Gas Ass'n v. Jewell*, 815 F.3d 544, 558–59 (9th Cir. 2016))); *MacDougal*, *supra* note 8.

90. *Safari Club Int'l*, 709 F.3d at 14.

91. *Id.* ("[The U.S. Fish and Wildlife Service's] reference to the IPCC's definition of 'likely' seems related only to the agency's confidence in the climate forecasts, not to forecasts on the species' survival.").

92. Urry, *supra* note 11.

93. *Id.*

94. Price, *supra* note 63; Urry, *supra* note 11.

95. See Urry, *supra* note 11.

about what evidence the Service can consider when determining the foreseeable future.⁹⁶ Further, the Supreme Court made clear that “Congress has spoken in the plainest of words, making it abundantly clear that the balance has been struck in favor of affording endangered species the highest of priorities.”⁹⁷ Because the proposed standard will limit the science used in listing decisions, it is contrary to the Act’s plain text.⁹⁸ This will lead to litigation concerning whether the proposed rule is arbitrary or capricious and continued litigation over listing decisions, both of which will burden the Service, environmentalists, and landowners.

Further, the Endangered Species Act does not require the best scientific data possible, only the best scientific data available.⁹⁹ Thus, creating a higher bar than the best available science also conflicts with the Act’s presumption in favor of conservation.¹⁰⁰ Courts consistently hold that the Service cannot demand a higher level of scientific certainty than available because the Act does not demand absolute confidence in the Service’s decision.¹⁰¹ Although the Service cannot base listings off of speculation, the Act only requires using information that is readily available, so “where there is no superior data, occasional imperfections do not violate the [Act].”¹⁰²

96. Letter from the Ctr. for Biological Diversity to Ryan Zinke, Sec’y, U.S. Dep’t of Interior, and Wilbur Ross, Sec’y, U.S. Dep’t of Commerce, *supra* note 72.

97. *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 194 (1977) (discussing Congress’s meaning in enacting the Endangered Species Act).

98. Letter from the Ctr. for Biological Diversity to Ryan Zinke, Sec’y, U.S. Dep’t of Interior, and Wilbur Ross, Sec’y, U.S. Dep’t of Commerce, *supra* note 72.

99. *Defs. of Wildlife v. Jewell*, 176 F. Supp. 3d 975, 1000 (D. Mont. 2016) (“[T]he Service must utilize the ‘best scientific data available,’ not the best scientific data possible.” (quoting *Bldg. Indus. Ass’n v. Norton*, 247 F.3d 1241, 1246 (D.C. Cir. 2001))); *MacDougal*, *supra* note 8. It is important that the U.S. Fish and Wildlife Service be able to make decisions based on the information available to it, otherwise decisions to protect species will not be made. Emerson, *supra* note 59.

100. Letter from the Ctr. for Biological Diversity to Ryan Zinke, Sec’y, U.S. Dep’t of Interior, and Wilbur Ross, Sec’y, U.S. Dep’t of Commerce, *supra* note 72.

101. *Defs. of Wildlife*, 176 F. Supp. 3d at 1003 (“Quite simply, the [U.S. Fish and Wildlife Service] cannot demand a greater level of scientific certainty than has been achieved in the field to date—the ‘best scientific data available’ . . . standard does not require that the [U.S. Fish and Wildlife Service] act only when it can justify its decision with absolute confidence” (quoting *Ariz. Cattle Growers’ Ass’n v. Salazar*, 606 F.3d 1160, 1164 (9th Cir. 2010))); *MacDougal*, *supra* note 8.

102. *Alaska Oil & Gas Ass’n v. Pritzker*, 840 F.3d 671, 680 (9th Cir. 2016) (“[W]here the information is not readily available, we cannot insist on perfection” (quoting *San Luis & Delta-Mendota Water Auth. v. Jewell*, 747 F.3d 581, 602 (9th Cir. 2014))); *Defs. of Wildlife*, 176 F. Supp. 3d at 1000 (quoting *Bldg. Indus. Ass’n*, 247 F.3d at 1247).

Therefore, even if the science is somewhat limited, so long as it is the best—or even the only—available, that is all the Act requires.¹⁰³ However, the proposed rule’s ambiguity will restrict the listing of species threatened by climate change since climate models may not provide a high enough degree of certainty to meet the new threshold.¹⁰⁴

Additionally, the proposed rule allowing the Service to decide not to designate critical habitat because it cannot manage the threat to the species aims directly at species whose habitats are being diminished by climate change.¹⁰⁵ Permitting the Service to have that kind of discretion when designating critical habitat will limit the amount designated, which will, in turn, hinder the species’s ability to recover.¹⁰⁶ For example, the Service will not be able to designate critical habitats for the 40% of American species scientists predict could become extinct due to climate change.¹⁰⁷ That outcome would undermine the entire purpose of the Act rather than address the perceived burdens associated with critical habitat designations.¹⁰⁸

C. *More Effective and Efficient Decision-Making*

Many critics of the Endangered Species Act believe the Act is ineffective and requires modernization.¹⁰⁹ They have long thought the Act hampers industry while failing to restore endangered species.¹¹⁰ Further, critics view the Act as inconsistent and confusing

103. MacDougal, *supra* note 8.

104. Notes from the Ga. Sierra Club on the Proposed ESA Rule Changes, *supra* note 64.

105. *Id.*

106. Fact Sheet from the S. Envtl. L. Ctr. on the Proposed Rewrite of Endangered Species Act Regulations (2018) (on file with the Georgia State University Law Review).

107. Holly Pearen, *Trump Attacks Vital Conservation Tool for Threatened and Endangered Species, Misses Real Problem*, ENVTL. DEF. FUND (Sept. 19, 2018), <http://blogs.edf.org/growingreturns/2018/09/19/critical-habitat-designations-trump-esa-regulations/> [<https://perma.cc/PPW7-TFKN>].

108. 16 U.S.C. § 1531(b) (2018); Pearen, *supra* note 107.

109. Peter S. Alagona, *The Endangered Species Act Needs a Reboot*, OUTSIDE (July 9, 2018), <https://www.outsideonline.com/2319931/endangered-species-acts-needs-update> [<https://perma.cc/MR2L-GMJZ>]; Fears, *supra* note 19; Randy Noel, *Upgrade and Modernize Endangered Species Act*, USA TODAY (Aug. 1, 2018, 6:10 PM), <https://www.usatoday.com/story/opinion/2018/08/01/upgrade-endangered-species-act-national-association-home-builders-editorials-debates/37249713/> [<https://perma.cc/5DCN-WHTZ>].

110. Matthew Brown, *Trump Administration Seeks Endangered Species Rule Changes*, BUS. INSIDER

to navigate.¹¹¹ Supporters of the proposed rule changes believe they will eliminate those unnecessary burdens, conflicts, and uncertainties.¹¹²

1. *The Unpredictability of Climate Change*

Given the wide variability of climate models, predicting Earth's future climate is an uncertain enterprise.¹¹³ Consequently, under its existing regulations, the U.S. Fish and Wildlife Service already declines to list select species given the uncertainty of climate models.¹¹⁴ Some courts state that future climate projections are too speculative and remote to be the basis of a species's listing.¹¹⁵ Those courts conclude that listings are arbitrary and capricious when the Service fails to explain a "discernable, quantified threat of extinction within the *reasonably* foreseeable future."¹¹⁶ Even though courts acknowledge rising temperatures, they also recognize the uncertainties in the magnitude, speed, and severity of them.¹¹⁷ Thus,

(July 19, 2018), <https://www.businessinsider.com/ap-trump-administration-seeks-endangered-species-rule-changes-2018-7> [<https://perma.cc/MUU6-M4VN>]; Daly, *supra* note 83.

111. Matthew Brown, *Trump Aims to End Automatic Protection for Some Species*, AP (July 19, 2018), <https://apnews.com/68e869b197c4485dab2709c607f28022> [<https://perma.cc/W4KJ-A7P7>]; Natter, *supra* note 11.

112. Darryl Fears, *Endangered Species Act Stripped of Key Provisions in Trump Administration Proposal*, WASH. POST (July 19, 2018, 2:06 PM), https://www.washingtonpost.com/news/animalia/wp/2018/07/19/endangered-species-act-stripped-of-key-provisions-in-trump-administration-proposal/?utm_term=.51eafa98267d [<https://perma.cc/2G9L-Y84W>]; Urry, *supra* note 11.

113. *Certainty vs. Uncertainty: Understanding Scientific Terms About Climate Change*, UNION CONCERNED SCIENTISTS (Mar. 19, 2010), https://www.ucsusa.org/global-warming/science-and-impacts/science/certainty-vs-uncertainty.html#.W-H_zqeZOqA [<https://perma.cc/5WGZ-R5DW>]; MacDougal, *supra* note 8.

114. Emily Ronis, *ESA Proceedings Center on Climate Change Projections*, WILDLIFE SOC'Y (Oct. 27, 2016), <http://wildlife.org/esa-proceedings-center-on-climate-change-projections/> [<https://perma.cc/AV6A-DEXW>].

115. *Alaska Oil & Gas Ass'n v. Pritzker*, No. 4:13-cv-00018-RRB, 2014 U.S. Dist. LEXIS 101446, at *54 (D. Alaska July 25, 2014), *rev'd*, 840 F.3d 671 (9th Cir. 2016) ("[F]orecasting more than 50 years into the future is simply too speculative and remote to support a determination . . ."); MacDougal, *supra* note 8.

116. *Alaska Oil & Gas Ass'n*, 2014 U.S. Dist. LEXIS 101446, at *55 n.69 (discussing the Service's listing of the bearded seal even though the "unknown, unquantifiable population reduction" was not going to occur for another 100 years).

117. *Alaska Oil & Gas Ass'n v. Pritzker*, 840 F.3d 671, 680 (9th Cir. 2016) ("[T]he only uncertainty is the magnitude of warming, the speed with which warming will take place, and the severity of its effect.").

supporters of the changes believe the new foreseeability standard would allow the Service to use available data to make a reliable prediction, avoiding speculation and preconception.¹¹⁸

There are hundreds of variables that affect Earth's climate, such as deforestation and the expansion or contraction of sea ice.¹¹⁹ Given the complexity of Earth's climate system, it is hard for scientists to understand it with total precision.¹²⁰ For example, if scientists used only fifteen variables to predict climate change and understood each one almost perfectly, at 95% accuracy, that climate model would only yield 46.3% reliability.¹²¹ Real climate models deal with exponentially higher complexities with much less understanding.¹²² Given that unreliability, along with the definition of probable, the new foreseeability standard could require the Service to use more reliable, tested methods that may not fully account for climate change when listing species.

2. *Flawed Science Indicates a Flawed Act*

Accordingly, parties that have resisted the Service's listings in the past dispute whether climate modeling constitutes the best available science.¹²³ Critics contend that because unverified models speculate on a species's possible fate, they should not be used in place of current demographics.¹²⁴ Essentially, they view these predictions as more akin to hypotheses than the best available science.¹²⁵ Further,

118. Factors for Listing, Delisting, or Reclassifying Species, 83 Fed. Reg. 35,194 (proposed July 25, 2018) (to be codified at 50 C.F.R. pt. 424).

119. Jeff Jacoby, *Why Are Climate-Change Models so Flawed? Because Climate Science is so Incomplete*, BOS. GLOBE (Mar. 14, 2017, 3:40 PM), <https://www.bostonglobe.com/opinion/columns/2017/03/14/why-are-climate-change-models-flawed-because-climate-science-incomplete/hekwjPBTScRpFyXaXnrWhI/story.html> [https://perma.cc/J6HQ-KZU2]. Some other variables that affect Earth's climate are cloud formation, topography, altitude, proximity to the equator, plate tectonics, sunspot cycles, volcanic activity, conversion of land to agriculture, reforestation, direction of winds, soil quality, El Niño and La Niña ocean cycles, prevalence of aerosols, and greenhouse gases. *Id.*

120. *Id.*

121. *Id.* ("Multiplying .95 by itself 15 times yields 46.3 percent.").

122. *Id.*

123. MacDougal, *supra* note 8.

124. *Id.*

125. *Id.*

critics argue the Act never intended to allow the use of speculative climate models.¹²⁶ The Service also recognizes the inherent limitations in downscaled climate models, which are used to understand climate at smaller, regional scales.¹²⁷ Climate change models have a tendency to predict more warming than has actually occurred, lending support to arguments about their speculative nature.¹²⁸ If scientists cannot make accurate predictions about the future of climate change, then the scientific community's understanding remains inadequate.¹²⁹

In addition, industry leaders worry that allowing the consideration of climate change effects when designating critical habitat will allow the Service to speculate and say, “[W]e think climate change would remove the habitat north to a higher elevation, and therefore we not only have to protect this habitat, but we have to protect this future habitat.”¹³⁰ The Service has explained that under the proposed rule, nonprudent determinations would continue only to be made in the rare circumstances where designation of critical habitat does not help conserve the species.¹³¹ Further, supporters of the changes view the proposed rule as consistent with the Act's regulatory scheme, since the Service currently does not designate critical habitat when it would not be beneficial to the species.¹³² If there is no way for the Service to identify and implement measures aimed at managing the threat, then critical habitat designation is not beneficial.¹³³ Therefore, critics

126. Emerson, *supra* note 59.

127. *Defs. of Wildlife v. Jewell*, 176 F. Supp. 3d 975, 1001 (D. Mont. 2016). “Downscaling techniques improve understanding of climate at smaller, regional scales compared to [global climate models], but their spatial resolution may still be inadequate to describe the variability of microclimates in which organisms live[.]” *Id.* (citation omitted).

128. Jacoby, *supra* note 119.

129. *Id.*

130. Emerson, *supra* note 59.

131. Barbara D. Craig & Cherise M. Gaffney, *Proposed Changes to Endangered Species Act Regulations Would Create Efficiencies Without Changing Species Protections*, STOEL RIVES LLP (July 24, 2018), <https://www.stoel.com/legal-insights/legal-updates/proposed-changes-to-endangered-species-act-regulat> [<https://perma.cc/M3AZ-T24H>].

132. 50 C.F.R. § 424.12(a)(1) (2018) (“A designation of critical habitat is not prudent when . . . [s]uch designation of critical habitat would not be beneficial to the species.”).

133. Jessica Wentz, *Proposed Amendments to Endangered Species Act Regulations Could Curtail Protections for Species Imperiled by Climate Change*, COLUM. L. SCH.: CLIMATE L. BLOG (Sept. 19, 2018), <http://blogs.law.columbia.edu/climatechange/2018/09/19/proposed-amendments-to-endangered->

of the Act believe the proposed rule will lead to a more consistent regulatory scheme better aimed at protecting species and private property rights.¹³⁴

III. Proposal

Climate change currently threatens more than 1,400 endangered species, and although there is no simple answer to perfectly address that threat, there must be a framework for embracing climate change effects in the Endangered Species Act's implementation.¹³⁵ Scientific uncertainty is unavoidable in environmental decision-making, but science is a fundamental aspect of the Act, and the decisions to list at-risk species and designate critical habitat must continue to be grounded in science.¹³⁶ Therefore, using the best science available must be a priority when making policy decisions.¹³⁷

Further, even though there are disagreements concerning climate change science, "it is not the role of . . . court[s] to resolve scientific disagreements[.]"¹³⁸ Thus, the U.S. Fish and Wildlife Service, with the help of scientists and other subject matter experts, must be able to approach the Act with climate change science in mind.¹³⁹ Although

species-act-regulations-could-curtail-protections-for-species-imperiled-by-climate-change/
[<https://perma.cc/9VKN-94GH>].

134. *US Agencies Propose Sweeping Changes to Endangered Species Act Implementing Regulations*, SQUIRE PATTON BOGGS: FRESH (Aug. 2, 2018), <https://www.freshlawblog.com/2018/08/02/us-agencies-propose-sweeping-changes-to-endangered-species-act-implementing-regulations/> [<https://perma.cc/9C73-HFT5>].

135. Emerson, *supra* note 59; Amelia Rosch, *Over 1,400 Endangered Species Are Threatened by Climate Change, Says New 'Red List,'* THINKPROGRESS (Nov. 18, 2014, 5:33 PM), <https://thinkprogress.org/over-1-400-endangered-species-are-threatened-by-climate-change-says-new-red-list-896bd08fd4b4/> [<https://perma.cc/U6PV-AMH4>]; Emily Zak, *8 Top Species Threatened by Climate Change*, CARE2 (July 4, 2018), <https://www.care2.com/causes/8-top-species-threatened-by-climate-change.html> [<https://perma.cc/39PL-KFVY>].

136. RUHL ET AL., *supra* note 37, at 505; Charise Johnson, *Protect the Science, Protect the Species*, UNION CONCERNED SCIENTISTS (June 9, 2017, 5:43 PM), <https://blog.ucsusa.org/charise-johnson/protect-the-science-protect-the-species> [<https://perma.cc/7D3B-JLYB>]; Pearen, *supra* note 107.

137. *See* Johnson, *supra* note 136.

138. *Airport Cmty. v. Graves*, 280 F. Supp. 2d 1207, 1222 (W.D. Wash. 2003) ("However, it is not the role of this court to resolve scientific disagreements between ACC's expert and the Corp's experts." (citing *Friends of the Earth v. Hall*, 693 F. Supp. 904, 922 (W.D. Wash. 1988))); RUHL ET AL., *supra* note 37, at 831.

139. Kalyani Robbins, *The Biodiversity Paradigm Shift: Adapting the Endangered Species Act to Climate Change*, 27 FORDHAM ENVTL. L. REV. 57, 98 (2015); Johnson, *supra* note 136.

mitigating the causes of climate change is important, “[g]oing for the jugular by regulating greenhouse gas emissions is *not* where the [Act] can be of most help to imperiled species.”¹⁴⁰ Therefore, there are a few ways the Act and its rules can be tailored to accommodate climate change.

A. *Ecosystems Over Species*

One method the U.S. Fish and Wildlife Service could adopt is a broader ecosystem-based approach, as opposed to the current focus on individual species. This approach would evaluate the species’s role in its respective ecosystem and would then use that to guide listing decisions and designation of critical habitat.¹⁴¹ One of the purposes of the Endangered Species Act is “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved.”¹⁴² Therefore, despite the Act’s current focus on individual species, it already helps protect their ecosystems, making this approach easy to adopt.¹⁴³ Further, maintaining and restoring ecosystems is required to protect against climate change.¹⁴⁴ For example, one benefit of this approach is the huge role that ecosystems play in absorbing climate change-causing pollutants like carbon dioxide.¹⁴⁵

In addition to combating climate change, biodiversity has other economic benefits, such as guaranteeing a stable food supply, which can eclipse the value of the land.¹⁴⁶ Consequently, the high economic benefits of this approach will ease concerns over regulating land use while simultaneously protecting species and preventing climate

140. J.B. Ruhl, *Climate Change and the Endangered Species Act: Building Bridges to the No-Analog Future*, 88 B.U. L. REV. 1, 59 (2008).

141. Hull, *supra* note 30, at 608.

142. 16 U.S.C. § 1531(b) (2018).

143. See Worland, *supra* note 81.

144. Hull, *supra* note 30, at 608; see also Matt Petronzio, *5 Major Threats to Biodiversity, and How We Can Help Curb Them*, MASHABLE (May 23, 2015), <https://mashable.com/2015/05/23/biodiversity-threats/#sUX3..9tuZqT> [<https://perma.cc/B6L5-WJED>].

145. William Moomaw, Gillian Davies & Max Finlayson, *Fight Climate Change with More Swamps*, EARTHSKY (Sept. 25, 2018), <https://earthsky.org/earth/fight-climate-change-wetlands-swamps> [<https://perma.cc/7H65-UXZN>]; Worland, *supra* note 81.

146. Worland, *supra* note 81.

change. Further, this approach recognizes that different ecosystems and critical habitats serve different utilities and need flexible management to continue those utilities.¹⁴⁷ Ensuring that ecosystems, and their component species, continue to function is a significant part of using the Act to respond to climate change.¹⁴⁸

B. Species “Feeling the Heat”

Alternatively, the U.S. Fish and Wildlife Service can narrow its current approach and focus on listing species impacted and threatened by climate change. The Service could effectively use the Act to identify impacted species, recognize which ones may benefit from critical habitat designation, and subsequently devise a recovery plan to help the species withstand the effects of climate change.¹⁴⁹ If the U.S. Fish and Wildlife Service uses this approach, it could identify climate change threatened species and critical habitat early, allowing for more time to develop a recovery plan.¹⁵⁰ If species are identified and listed earlier, it will allow for more flexible regulations and recovery efforts because the Service can implement conservation actions before a species is in a worse position.¹⁵¹ Although there will inevitably still be regulations, allowing for more flexibility will remove some of the burden on parties who must follow those regulations.

Since species listings serve as the road map for the Endangered Species Act’s implementation, the Service needs to address climate change impacts on species.¹⁵² Aggressively focusing on species impacted by climate change allows the Service to do that. For example, the Act could provide a “climate-adaption-inspired” framework for listing decisions, as opposed to simply having factors to consider.¹⁵³ The framework would consist of steps the Service

147. Pearen, *supra* note 107.

148. Hull, *supra* note 30, at 608.

149. Ruhl, *supra* note 140.

150. *Id.* at 60.

151. *See id.*

152. Robbins, *supra* note 139, at 100.

153. *Id.* at 99.

must take, such as: (1) determining the possible effects climate change has on species and their ecosystems; (2) determining whether climate change will mix with other threats to species; (3) identifying how great of an impact these threats will have on a species's ability to recover; and (4) evaluating how likely the Service is to succeed in recovering the species when threatened by climate change.¹⁵⁴

In addition, this approach can use methods from the approach previously discussed, allowing for more flexible and multifaceted implementation of the Act.¹⁵⁵ Given the diversity and complexity of ecosystems, the loss of one species can have a profound effect on others, and on the ecosystem as a whole.¹⁵⁶ Therefore, if one species's recovery harms another, the Service could use the broader ecosystem approach to promote species diversity and the ecosystem's functions.¹⁵⁷

C. *We Are All in This Together*

Although the Endangered Species Act can provide an efficient method to protect species and combat climate change, the U.S. Fish and Wildlife Service cannot do it alone. Therefore, it is imperative the Service work with other key players to protect species and fight climate change. The Service and current administration must work with stakeholders, such as landowners, industry leaders, and individual states, to save species on a larger scale.¹⁵⁸ The Obama Administration had success when it took this approach previously.¹⁵⁹ Working in cooperation with landowners and industries to make listings unnecessary eliminates any perceived burden on their land

154. *Id.*

155. *See supra* Section III.A.

156. *Plants, Animals, and Ecosystems*, EPA, <https://archive.epa.gov/climatechange/kids/impacts/effects/ecosystems.html> [https://perma.cc/K4Q8-DAQE] (last updated May 9, 2017).

157. Ruhl, *supra* note 140, at 61.

158. *Donald Trump Has Endangered Species in His Sights*, *supra* note 9.

159. *Id.* "A spectacular example of this approach was the Obama administration's decision to work with states and private parties to protect millions of acres of habitat across [ten] Western states occupied by the greater sage grouse so as to make a listing unnecessary." *Id.*

use because if there is no listing, then there are no regulatory requirements.

The government can use multiple avenues to help motivate stakeholders to cooperate, such as economic incentives or negotiations.¹⁶⁰ Other agencies already use this approach; for example, the Environmental Protection Agency implemented programs under the Clean Water Act to provide funding and incentives to states or private parties to improve pollution management.¹⁶¹ In this instance, working in cooperation can reduce disagreements over listing decisions and critical habitat designations, while simultaneously discovering novel ways to make species and ecosystem conservation an economic opportunity.¹⁶² This can be accomplished by incentives, such as coupling critical habitat designations with financial and technical help for private landowners.¹⁶³ Therefore, parties will need to work together and explore existing and new funding, which they can direct towards maintaining or creating critical habitats for impacted species.

Further, providing incentives for the Act's critics is an important factor, but working to create critical habitats will also have a substantial effect on threatened species. Animals are already responding to the effects of climate change by migrating to places better suited for their survival.¹⁶⁴ If the U.S. Fish and Wildlife Service works with other stakeholders to create new habitats for these

160. *Id.*

161. RUHL ET AL., *supra* note 37, at 261. The U.S. Fish and Wildlife Service also explored opportunities for “incentives for voluntary partnership with private landowners.” *Landowner Incentives*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/endangered/improving_ESA/landowner_incentives.html [https://perma.cc/882F-VRG8] (last updated Oct. 2, 2014).

162. See Pearen, *supra* note 107; Paula Swedeen, *Statement on Proposed Changes to the Endangered Species Act*, CONSERVATION NORTHWEST (Aug. 2, 2018), <https://www.conservationnw.org/news-updates/statement-on-endangered-species-act/> [https://perma.cc/29S2-67JX].

163. Pearen, *supra* note 107.

164. Nick Bradford, *Marine Species on the Move*, NEEF, <https://www.neefusa.org/weather-and-climate/marine-species-move> [https://perma.cc/FKM8-UR8E] (last visited Nov. 4, 2018); EPA, *supra* note 156; Craig Welch, *Half of All Species Are on the Move—And We’re Feeling It*, NAT’L GEOGRAPHIC (Apr. 27, 2017), <https://news.nationalgeographic.com/2017/04/climate-change-species-migration-disease/> [https://perma.cc/CN8F-GJA6].

displaced species, the Service will have another avenue for species recovery.

In addition to working with stakeholders, the Service can work with other agencies and subject matter experts. Since the Service focuses more on the effects climate change has on species, it can give expert assistance to agencies, like the Environmental Protection Agency, that regulate its causes by informing them of how climate change is affecting species.¹⁶⁵ Further, scientific experts, like the IPCC, can continue to provide agencies with authoritative science to help guide their decisions.¹⁶⁶ Because agencies must regulate “with developing evidence, with conflicting evidence, and, sometimes, with little or no evidence at all,”¹⁶⁷ they also must use rational and professional opinions to enhance the best available science.¹⁶⁸

CONCLUSION

The implementation of the Endangered Species Act and the effects of climate change will continue to be controversial issues, but they are also important problems that must be explored and debated. We have a responsibility to protect threatened species from extinction so future generations may observe them in their natural habitat.¹⁶⁹ Climate change is the fastest growing cause of species loss in America,¹⁷⁰ and the Endangered Species Act offers a way to

165. Ruhl, *supra* note 140.

166. Ole Petter Ottersen et al., *The Political Origins of Health Inequity: Prospects for Change*, 383 LANCET 630, 635 (2014); Dino Grandoni & Chris Mooney, *Interior Department Rejects 25 Endangered Species Petitions, Including Several Linked to Climate Change*, WASH. POST (Oct. 5, 2017, 7:27 AM), https://www.washingtonpost.com/news/energy-environment/wp/2017/10/05/interior-department-rejects-25-endangered-species-petitions-including-several-linked-to-climate-change/?utm_term=.62d36d44d6d3 [https://perma.cc/AU8K-JAVX].

167. *Ethyl Corp. v. EPA*, 541 F.2d 1, 6 (D.C. Cir. 1976) (discussing how agencies cannot tell the future, but nonetheless have to evaluate the effects of unprecedented environmental changes); Jaffe, *supra* note 8.

168. See MacDougal, *supra* note 8.

169. Johnson, *supra* note 136; Rob Picheta, *This is the ‘Last Generation’ That Can Save Nature, WWF Says*, CNN (Oct. 30, 2018, 8:43 AM), <https://www.cnn.com/2018/10/29/health/wwf-wildlife-population-report-intl/index.html> [https://perma.cc/B2XK-QVCR]; 9 *Animals That Are Feeling the Impacts of Climate Change*, U.S. DEP’T INTERIOR: BLOG (Nov. 16, 2015), <https://www.doi.gov/blog/9-animals-are-feeling-impacts-climate-change> [https://perma.cc/AY59-BTQM].

170. Harvey, *supra* note 29; *The Extinction Crisis*, CTR. FOR BIOLOGICAL DIVERSITY,

proactively recognize and focus on climate change's impacts on species.¹⁷¹ The language of the Act is clear: it does not require absolute certainty, just reasonable reliance.¹⁷² Therefore, opening the foreseeable future framework to only probable threats will undermine the Act's purpose.¹⁷³

Although it is true that the future is uncertain, given the unprecedented rate and scale of climate change, scientific models are the best available science to try to predict an unforeseeable future.¹⁷⁴ Thus, it is imperative that scientists continue to increase their knowledge of climate change by improving these models' accuracy.¹⁷⁵ We must ensure that listing and critical habitat designation decisions continue to be science-based to further the goals of the Act—preserving and recovering threatened species—and climate models are the best way to mitigate climate change's impact on species.¹⁷⁶

While scientists continue to work toward refining their understanding of climate change, the U.S. Fish and Wildlife Service and other key players can accommodate available climate change science in the Endangered Species Act's implementation. The Service can continue to make designations using the best science available, focusing on species threatened by climate change, and also adopting a broader ecosystem-based approach. Additionally, the Service can work with landowners and industry by offering incentives to help protect species, while simultaneously furthering the goals of the Act and reducing the burden on stakeholders. Finally, decisions concerning which species require protection under the Act

https://www.biologicaldiversity.org/programs/biodiversity/elements_of_biodiversity/extinction_crisis/ [https://perma.cc/R9FP-LNUA] (last visited Nov. 4, 2018).

171. Ruhl, *supra* note 140, at 62.

172. *Alaska Oil & Gas Ass'n v. Pritzker*, 840 F.3d 671, 679–80 (9th Cir. 2016) (discussing how the Act does not require listing decisions be made only when the “underlying research is ironclad and absolute,” as long as the Service can provide a “reasonable explanation” for its decision).

173. *See* 16 U.S.C. § 1531(b) (2018).

174. Urry, *supra* note 11.

175. Harper, *supra* note 42.

176. § 1531(b); Harper, *supra* note 42; Pearen, *supra* note 107.

must be informed by scientists, biologists, and other conservation experts, not by policymakers alone.¹⁷⁷

Ultimately, the U.S. Fish and Wildlife Service must focus on using the Endangered Species Act to help threatened species cope with the effects of climate change, not the causes.¹⁷⁸ Scientific certainty is always preferable to probabilities, “but, in this world, nothing is certain except death and taxes.”¹⁷⁹ Therefore, the Endangered Species Act remains “the strongest and most effective tool we have to repair the environmental harm that is causing . . . species to decline.”¹⁸⁰

177. Johnson, *supra* note 136.

178. Ruhl, *supra* note 140, at 62.

179. Letter from Benjamin Franklin to Jean-Baptiste Le Roy (Nov. 13, 1789), in 15 THE PAPERS OF JEFFERSON 23, 23 (Julian P. Boyd ed., 1958), <https://founders.archives.gov/documents/Jefferson/01-15-02-0018>.

180. Raymond, *supra* note 1.